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10/538,099	06/08/2005	Klemens Brunner	NL 030920	6921

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EXAMINER
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YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
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1794

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08/07/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/538,099	<b>Applicant(s)</b> BRUNNER ET AL.	
	<b>Examiner</b> Marie R. Yamnitzky	<b>Art Unit</b> 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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1. This Office action is in response to applicant's amendment filed May 04, 2009, which amends the specification, including the abstract, amends claims 1, 13, 16 and 17, and cancels claims 5, 18 and 19.

Claims 1-4 and 6-17 are pending.

2. The objection to the disclosure as set forth in the Office action mailed September 02, 2008 is overcome by amendment.

The rejection of claims 13-15 and 17 under 35 U.S.C. 112, 2<sup>nd</sup> paragraph, is overcome by claim amendment.

The rejections of claims 18 and 19 are rendered moot by claim cancellation.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, 4 and 6-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Ikehira et al. (US 2002/0193532 A1).

See the entire patent application publication. In particular, see Examples 3 and 6 (pages 33-35). Example 3 provides a polymeric light emitting substance that meets the limitations of

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the combination required for the device of present claims 1, 2, 4 and 6-15, and meets the limitations of the combination claimed in present claims 16 and 17. The polymeric light emitting substance of Ikehira's Example 3 is used to make the electroluminescent device of Ikehira's Example 6.

The polymeric light emitting substance synthesized per Ikehira's Example 3 comprises N-octyl-3,6-carbazole units, 9,9-dioctyl-2,7-fluorene units, and units of an iridium phenylpyridine complex. This polymeric light emitting substance corresponds to a combination of a charge-transporting conjugated donor polymer/compound and a phosphorescent acceptor compound dispersed in the donor polymer/compound wherein the donor and acceptor are integrated to form one integrated donor-acceptor polymer as recited, for example, in present claims 12 and 15.

The N-octyl-3,6-carbazole units are structural units of the first formula in present claims 13 and 17 wherein Y is a single bond and -X- is  $-NR^1-$  wherein  $R^1$  is a  $C_8$  alkyl. Each carbazole unit comprises two phenylene sub-units wherein the path length of the shortest uninterrupted path of unsaturated atoms connecting the first and second radical sites is an odd integer as required by each of the present claims. The path length of said shortest uninterrupted path in the phenylene sub-units of the N-octyl-3,6-carbazole units is 1 as required by present claim 2, and the first and second radical sites in each of these phenylene sub-units are positioned relative to one another in a meta arrangement as required by present claim 9. The total number of unsaturated atoms in each of these odd-integer sub-units is 6, thus further meeting the limitations of present claim 6.

The only odd-integer conjugated multivalent radical sub-units in the polymer of Example 3 are the two phenylene sub-units of the N-octyl-3,6-carbazole units. Based on the identity of the other units in the polymer, the arrangement of conjugated units within the conjugated chain of the polymer inherently meets the limitations of present claim 4 regardless of the specific arrangement of the fluorene, carbazole and iridium complex units within the polymer.

The total number of unsaturated atoms of each of the conjugated units in the polymer of Example 3 that is not an odd-integer sub-unit is 6, thus further meeting the limitations of present claim 8.

The energy level requirements of present claims 1, 7, 10, 11, 13, 16 and 17 are inherently met by Ikehira's Example 3 polymeric light emitting substance.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ikehira et al. (US 2002/0193532 A1) as applied to claims 1, 2, 4 and 6-17 above, and for the further reasons set forth below.

Ikehira's polymer of Example 3 contains fluorene units which provide more than one even-integer conjugated multivalent radical sub-unit, with at least two even-integer conjugated

multivalent radical sub-units connected to one another in the conjugated chain. Accordingly, Ikehira's polymer of Example 3 does not meet the limitations recited in present claim 3. However, Ikehira's polymers are not required to comprise the fluorene units included in the polymer of Example 3.

The fluorene units of the Example 3 polymer have the structure represented by the second formula on page 12 of the prior art. Fluorene units having odd-integer conjugated multivalent radical sub-units, as provided by the structure represented by the third formula on page 12 of the prior art, may be used in place of the fluorene unit having even-integer sub-units, as well as other odd-integer units (such as those provided by the second, fifth, eighth or tenth formula on page 9). Utilizing an odd-integer unit in place of the fluorene units in the Example 3 polymer results in a polymer in which the only even-integer sub-units in the conjugated chain are those provided by the iridium complex, and which are capable of providing a polymer having the arrangement of even-integer units required by claim 3. Repeating units having a single even-integer conjugated multivalent radical sub-unit are also disclosed that are capable of being incorporated into a conjugated chain in the arrangement required by present claim 3 (such as those provided by the first, third, fourth, sixth, seventh, ninth or eleventh formula on page 9). A repeating unit having a single even-integer unit can be utilized in place of the fluorene units in the Example 3 polymer to provide polymers meeting the limitations recited in present claim 3. As taught in paragraph [0093], the different repeating units of the polymer may have various arrangements within the polymer structure. Further, an intent of the prior art is to provide a polymer capable of exhibiting light emission from the triplet excited state of the metal complex. Guided by the

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teachings of the prior art, it would have been within the level of ordinary skill of a worker in the art at the time of the invention to determine suitable and optimum combinations and arrangements of different repeating units taught in the prior art in order to provide a polymer capable of exhibiting light emission from the triplet excited state of the metal complex.

7. Claims 1-4, 6-11, 13, 14, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 2004/0062930 A1).

Roberts et al. disclose conjugated polymers having charge transporting properties, and teach mixing of a phosphorescent compound with the polymer. For example, see paragraphs [0006], [0056]-[0059], [0077]-[0089], [0113]-[0115], [0149]-[0161], [0352]-[0363] (Example 21), [0372]-[0373] (Example 25), and [0390]-[0395].

Roberts' polymers of Examples 21 and 25 are charge-transporting conjugated donor polymers/compounds having a conjugated chain including one or more odd-integer conjugated multivalent radical sub-units as required by the present independent claims. In both of these polymers, the carbazole repeat unit, which is a structural unit of the first formula in present claims 13 and 17 wherein Y is a single bond and -X- is -NR<sup>1</sup>- wherein R<sup>1</sup> is a C<sub>6</sub> aryl, comprises two phenylene sub-units wherein the path length of the shortest uninterrupted path of unsaturated atoms connecting the first and second radical sites is an odd integer as required by each of the present claims. The path length of said shortest uninterrupted path in the phenylene sub-units of the carbazole repeat unit is 1 as required by present claim 2, and the first and second radical sites in each of these phenylene sub-units are positioned relative to one another in a meta arrangement

as required by present claim 9. The total number of unsaturated atoms in each of these odd-integer sub-units is 6, thus further meeting the limitations of present claim 6.

Roberts' polymers of Examples 21 and 25 contain even-integer conjugated units and odd-integer conjugated units. The arrangement of conjugated units within the conjugated chain of the polymer of Example 21 meets the limitations recited in present claims 3 and 4. The arrangement of conjugated units within the conjugated chain of the polymer of Example 25 meets the limitations recited in claim 4. The total number of unsaturated atoms of each of the conjugated units in the polymers of Examples 21 and 25 that is not an odd-integer sub-unit is within the scope of present claim 8.

Roberts et al. provide examples of electroluminescent devices in which a phosphorescent acceptor compound is mixed with a polymer according to Roberts' invention. See [0390]-[0395] for a description of devices in which Ir(ppy)<sub>3</sub>, (bthpy)<sub>2</sub>Ir(acac) or Pt(OEP) is used in the light emitting layer of the device in combination with a polymer. The devices of these examples do not use the polymer of Example 21 or Example 25, and no specific example of a device is provided in which one of these phosphorescent acceptor compounds (or any of the phosphorescent compounds suggested in paragraph [0161]) is used in combination with the polymer of Example 21 or Example 25. However, given Roberts' teachings, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to utilize a phosphorescent compound in combination with the polymer of Example 21 or Example 25 in order to provide an electroluminescent device similar to those described in paragraphs [0390]-[0395]. The energy level requirements recited in present claims 1, 7, 13, 16 and 17 are



inherently met by Roberts' polymers of Examples 21 and 25. The energy level requirements recited in present claims 10 and 11 are inherently met by any of Ir(ppy)<sub>3</sub>, (bthpy)<sub>2</sub>Ir(acac) or Pt(OEP) in combination with Roberts' polymer of Example 21 or 25.

8. Applicant's arguments filed May 04, 2009 have been fully considered but they are not persuasive.

With respect to the prior art rejections under 35 U.S.C. 102(e) and 103(a), applicant argues that the examiner has provided no basis for the statement of inherency with respect to the energy level requirements as set forth in previously rejected claims 5, 7, 10 and 11 (now in claims 1, 7, 10, 11, 13, 16 and 17).

The energy level requirements of the present claims are considered by the examiner to be inherently met by the prior art references because, for example, the prior art discloses polymers comprising sub-units which are disclosed in the present application as providing the energy level requirements of the present claims.

With respect to independent claim 9 and the rejection based on the Ikehira reference, applicant argues that the Office action does not clearly explain how Example 3 of the applied art meets the claim, and argues that Example 3 does not disclose or suggest a conjugated chain including one or more phenylene-based sub-units as required by claim 9. The examiner respectfully disagrees. As explained in the rejection, each carbazole unit of the N-octyl-3,6-carbazole units of Ikehira's polymer of Example 3 comprises two phenylene sub-units wherein the path length of the shortest uninterrupted path of unsaturated atoms connecting the first and

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second radical sites is an odd integer, and the first and second radical sites in each of these phenylene sub-units are positioned relative to one another in a meta arrangement as required by claim 9.

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 7:00 a.m. to 3:30 p.m. Monday and Wednesday-Friday.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

/Marie R. Yamnitzky/  
Primary Examiner, Art Unit 1794

MRY  
August 03, 2009